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## REMARKS

Claims 1 and 7 have been amended. No claims have been canceled or added. Hence, claims 1 – 20 and 41 – 62 remain pending in the application. As a preliminary matter, Applicant notes that the Office Action states that claims 1 – 62 are pending. However, claims 21 – 40 were canceled previously in the Preliminary Amendment filed May 24, 2003, and are therefore no longer pending.

Claims 1 – 20 and 41 – 62 are rejected under 35 U.S.C 103(a) as being unpatentable over U.S. Patent No. 5,319,777, herein Perez.

### Perez

Perez teaches about an "electronic spreadsheet system and method in which the spreadsheets are connected through a local area network and in which the spreadsheet calculation models are separate from the databases upon which they operate", allowing "users to create and control their own spreadsheet models while working with one, consistent pool of information". Perez further teaches that "a method and apparatus for storing and retrieving information in which the data are stored in one or more **multi-dimensional arrays**.... Users of the system select subarrays of data from the **multi-dimensional array** as the raw data for their spreadsheets. Subarrays are selected by specifying sets of element identifiers identifying the data to be included in each subarray." (see Summary of the Invention)

As taught by Perez, the mechanism for "storing and retrieving information in which the data are stored in one or more **multidimensional arrays**" is a table server. "Each table server can store one or more **multidimensional arrays** of data having this dimensional structure and any number of dimensions." (col. 5, lines 17 – 50, cited by the Office Action). "A user... of one of the personal computers connected to the network ... seeking to use in a spreadsheet some of the data stored in the multidimensional array illustrated in FIG. 2, gains

access to the table server storing this array ... [and] instructs the transmission of a selected "slice" of data from the table server to the PC. The instruction code controlling the selection and transmission of this slice of data from table server 11 to PC 1 identifies each datum within the slice, or subarray of the **multidimensional array**, by the set of element identifiers uniquely identifying that datum." (col. 6, lines 20 – 54, cited by the Office Action).

### **Claim 1**

Claim 1, as amended, requires:

receiving, at a database server, a database query that specifies an operation for  
manipulating data;

in response to receiving said database query, the database server executing the  
database query by performing steps that include:

retrieving data from a relational structure;

storing the data in a non-relational structure that can be addressed as a multi-  
dimensional array; and

performing said operation specified in the database query on said data.

Claim 1 thus requires "retrieving data from a relational structure" and "storing the data in a non-relational structure", as well as "performing [an] operation specified in [a] database query". Importantly, these steps are performed by a "database server executing the database query" "in response" "to receiving, at [the] database server, [the] database query." A database server performing these steps in this way in response to receiving a database query is not suggested in any way much less disclosed by cited art.

The Office Action cites a "data request" in fig. 11 as teaching a database query and col. 6, lines 2 - 54 as teaching a database server receiving a database query. These passages and figures describe a table server receiving an instruction code that identifies a subarray of a

multi-dimensional array to transmit to the user. Apparently, the Office Action has correlated the database query claimed to a data request, the instruction code and the database server claimed to a table server. Even, if these correlations are accurate, which they are not, Perez nevertheless fails to suggest much less disclose all the limitations from claim 1.

First, Perez fails to teach that, in response to receiving a database query, that a database server retrieves data from a "relational structure". Rather, Perez expressly teaches that, in response to receiving an instruction code, that the table server retrieves data (i.e. subarray) from a **multi-dimensional array**, not from a relational structure.

Even assuming that Perez teaches that the table server retrieves data from a non-relational structure in response to receiving an instruction code, Perez fails to teach that, also in response to receiving a database query, that the data retrieved is stored in a multi-dimensional array, where the database server performs operations specified by the query. Rather, Perez teaches that data, once retrieved, is transmitted to the user. While it may be true that operations are performed upon the transmitted data by the user's PC, these operations are however not being performed by a database server in response to receiving a database query, as claimed.

In fact, the Office Action admits that Perez fails to disclose storing data in a non-relational structure in the way claimed, but that it would be obvious to do so based on Perez's teaching of updating spreadsheets in columns as taught in col. 2, line 35 – col. 3, line 10. Even if this allegation were true, Perez nonetheless fails to disclose storing data in a non-relational structure in the way claimed. Specifically, claim 1 requires "retrieving data from a relational structure" and "storing the data in a non-relational structure", where, importantly, these steps are performed by a database server in response to receiving the database query. Thus, even though updates to spreadsheets may teach storing data in a non-relational

structure, it fails to teach a database server that performs, in response to receiving a database query, steps that include both storing the data in a non-relational structure and retrieving the data from a relational structure.

For the foregoing reasons, claim 1 is patentable. Reconsideration and allowance of claim 1 is respectfully requested.

### Claim 7

Claim 7 recites:

a database server receiving a database query that:

references data in a relational structure **as if the data was stored in a multi-dimensional array,**

in response to receiving said database query the database server executing the

database query by performing steps that include:

retrieving the data from said relational structure,...

Importantly, claim 7 requires a database server that executes **a database query that "references data stored in a relational structure as if the data was stored in a multi-dimensional array."** In addition, claim 7 requires "retrieving the data from [a] relational structure" in response to receiving such a query.

This novel feature provides the ability to write a query to access relation structures that are written in a new way. For example, to write a query that computes column values that need the input of multiple rows, the query might have to be written to specify an inscrutable combination of self-joins and sub-queries. With the novel feature cited above, you treat relational data as data in a multi-dimensional array and write queries that are easier to develop, understand, and modify.

Perez fails to disclose or suggest this powerful new feature. Perez teaches about a data request that both references data as if it were stored in a multi-dimensional array and that is in fact stored in a multi-dimensional array. This point is shown by the following passage.

"if n.sub.1, n.sub.2, n.sub.3 and n.sub.4 are the number of elements in dimensions a, b, c and d, respectively, of the array and if c=2 for the manufacturing department and d=1 for the current year, the instruction code for this slice would identify all sets of element identifiers for which (a,b,c,d)=(i, j, 2, 1), where i=1 to n.sub.1 ; and j=1 to n.sub.2." (col. 6, lines 40 – 55)

The passage shows the instruction code references data in the **multi-dimensional array** by specifying integers of subscripts of the multi-dimensional array that holds the data – the usual way of referencing data that is stored in an array. Thus, Perez simply teaches to access data that is both referenced and in fact stored and retrieved as data from a multi-dimensional array. Claim 7, on the other hand, requires data that is referenced as if it were stored in a **multi-dimensional array** but that is in fact stored and retrieved from a different structure that is relational.

Furthermore, claim 1 and Perez differ at an even more general level. Perez teaches that data stored in a particular type of data structure is also referenced as being stored in that type of data structure. Claim 7, on the other hand, requires storing data in one type of data structure (i.e. relational) but referencing the data as being stored in another type of data structure (i.e. multi-dimensional array). This feature Perez fails to teach.

Based on the foregoing, claim 7 is patentable over Perez. Reconsideration and allowance of claim 7 is respectfully requested.

**Claim 12**

Claim 12 requires, "in response to receiving the database query, the database server performing the steps of" "retrieving a first set of data from a first relational structure" and "storing the first set of data in a non-relational structure." For reasons similar to those discussed with respect to claim 1, Perez fails to disclose responding to a database query in this way.

Claim 12 is therefore patentable. Reconsideration and allowance of claim 12 is respectfully requested.

**Dependant Claims**

The pending claims not discussed so far are dependant claims that depend on an independent claim that is discussed above. Because each of the dependant claims include the limitations of claims upon which they depend, the dependant claims are patentable for at least those reasons the claims upon which the dependant claims depend are patentable. Removal of the rejections with respect to the dependant claims and allowance of the dependant claims is respectfully requested. In addition, the dependent claims introduce additional limitations that independently render them patentable. Due to the fundamental difference already identified, a separate discussion of those limitations is not included at this time.


For the reasons set forth above, Applicant respectfully submits that all pending claims are patentable over the art of record, including the art cited but not applied. Accordingly, allowance of all claims is hereby respectfully solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Respectfully submitted,

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